

O macho de *punctata* só possúe 4 manchas pardo-ennegrecidas no abdomen: uma de cada lado dos tergitos 3 e 4 (na fema, taes manchas se encontram em numero de 6, nos tergitos 3-5). O quinto tergito do macho é pela metade mais comprido do que o antecedente. As asas são iguaes nos dois sexos em desenho e coloração. Dou aqui uma figura da asa (fig. 11). O adulto (macho) em vida é de coloração uniforme amarello-ferruginea clara e as manchas pardo-ennegrecidas se destacam nitidamente no thorax e no abdomen. Nos exemplares seccados, os ultimos tergitos abdominaes são em parte escurecidos.

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Notes on neotropical ants, including the descriptions of new forms  
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(With 14 figures)

The new ants upon which this paper is based are from several sources. Most of them are from Dr. W. M. Wheeler's collection, taken by himself in British Guiana, Guatemala, or Costa Rica; by C. R. Halter from the stomachs of tree toads in Nicaragua or by Schwarz and Barber in Guatemala. Two forms from Costa Rica were kindly given me by Dr. George C. Wheeler of the University of North Dakota. A third of the new forms was part of a collection made by myself at Soledad, Cienfuegos, Cuba, in the summer of 1933 as an Atkins Fund and University Fellow of Harvard University. To Dr. Wheeler and Dr. Thomas Barbour I am grateful for this opportunity to study and collect in such an interesting region.

Most of the ants here described are of the cosmopolitan dacetonine genus *Strumigenys*, the peculiar small to minute and timid ants of great mandibular and hair specialization, leading, for the most part, an esoteric life underground or in rotten wood. This genus is proving far larger than hitherto suspected and many new forms undoubtedly still remain to be collected in the tropics. A strange new dacetonine genus, *Heptastruma*, is here described from Cuba. It has unusual mandibles and remarkable transverse ridges on the head. A vestigial-eyed Cuban *Paratrechina* (*Nylanderia*) from a cave is also described. Only noteworthy records of

previously described ants are here given. The records are Cuban and of my collection, unless otherwise indicated.

It is a pleasure to acknowledge my great indebtedness to Dr. W. M. Wheeler, partly for the use of his collection and splendid library on ants, but mainly for his generous aid and invaluable suggestions.

Subf. Ponerinae

*Ponera ergatandria* Forel

Workers of this species were taken upon three occasions at Soledad.

*Leptogenys maxillosa* F. Smith var. *falcata* Roger

A single worker of this ant, apparently known only from the original 1861 records, was taken on the walk before Mr. Lloyd-Rees' house at Soledad, August 21.

*Anochetus (Anochetus) mayri* Emery

Three females and several workers referable to this form rather than the subsp. *laeviusculus* Wheeler were taken at Soledad.

Subf. Myrmicinae

*Cardiocondyla emeryi* Forel

Workers and several of the uniformly dark queens were taken upon various occasions at Soledad.

*Tetramorium simillimum* (Nylander)

The second Cuban record for this species; collected several times at Soledad.

*Pheidole cubaensis* Mayr var. *grayi* Mann

Flourishing colonies of this black variety were found at Soledad, one colony inhabiting a crevice in the limestone outcrops of the Limones Seboruco in *Macromischa* fashion.

*Pheidole punctatissima* Mayr subsp. *jamaicensis*  
var. *barbouri* Wheeler

Several colonies taken at Soledad.

*Crematogaster barbouri*, n. sp. (Fig. 1)

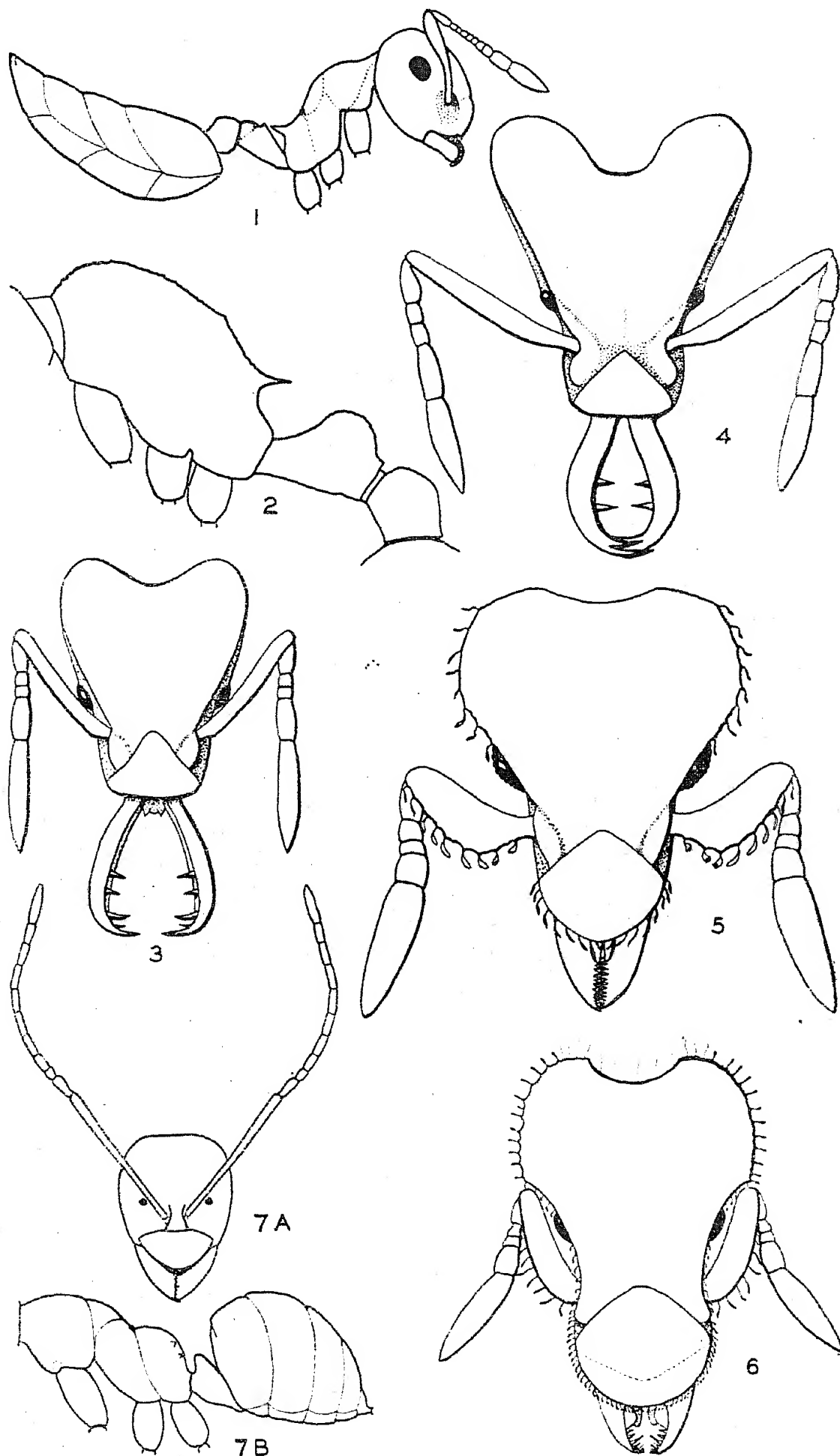
Worker: Length 1.9-2.7 mm.

Head a trifle longer than broad, posterior border slightly impressed, anterior border of the closed mandibles convex; eyes convex, protruding from the lateral margins, closer to the posterior margin than to the antennal insertions; frontal carina low, divergent; antennal fossae including a median portion of the two posterior clypeal borders; frontal area impressed, triangular; clypeus of a median convex circular area separated by a fossa from the lateral, slightly convex, extensions; anterior clypeal margin evenly convex; mandibles with four blunt teeth, penultimate larger than the preceding two, apical tooth much the largest; outer mandibular border slightly impressed, inner border a little concave; antennal scapes barely exceeding posterior margin of head, incrassate distally, curved inwardly towards the base; first funicular joint slightly longer than the following three together; joints 3-6 of the funiculus broader than long, 7th joint as broad as long; terminal joints longer than the preceding three together; the three jointed incrassate club longer than remainder of the funiculus. Thorax strongly impressed at the mesoëpinotal suture; epinotal spines triangular, stout, very slightly divergent, directed backward and upward, less than half as long as the distance between them. Petiole in profile with the anterior face flat and ventral surface gently convex to flat; dorsal surface meeting the anterior face at right angles, thence concave to the postpetiole; a third longer than high. Postpetiole subglobose. Abdomen broad, triangular, flat to slightly concave on the dorsal surface. Legs of medium proportions.

Surface of body and appendages smooth and shining translucent; on the sides of thorax and epinotum sparse and interrupted rugæ; thorax, petiole, and postpetiole with fine punctations.

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Fig. 1. *Crematogaster barbouri* n. sp., lateral view of worker. — Fig. 2. *Rogeria* (s. str.) *scabra* n. sp., lateral outline of thorax and pedicel of worker. — Fig. 3. *Strumigenys* (s. str.) *tridens* n. sp., outline of head of worker. — Fig. 4. *Strumigenys* (s. str.) *ferox* n. sp., outline of head of worker. — Fig. 5. *Strumigenys* (*Cephaloxys*) *studiosi* n. sp., outline of head of worker, showing marginal hairs. — Fig. 6. *Strumigenys* (*Cephaloxys*) *depressiceps* n. sp., outline of head of worker, showing marginal hairs. — Fig. 7. *Paratrechina* (*Nylanderia*) *trogodytes* n. sp., worker; A, outline of head; B, lateral outline of body.



Explication of figures see on page 24.

Hairs of body long, erect, fine, sparsely distributed, pointed or truncate, more numerous and pointed on the antennal scapes and legs; short fine hairs on antennal funiculi and tarsal joints.

Color of body yellowish with a brownish tinge on the head, approaching amber on the gaster of some specimens; legs pale yellow. Hairs honey-colored, paler on antennal funiculi and tarsal joints.

Female: Length 4.3-4.4 mm.

Resembling the worker but with the usual sexual differences and the following:

Frontal area more deeply impressed, with parallel sides and rounded apex; clypeus with about 5 somewhat irregular carinulae on each side of a smooth median area; mandibles 5-dentate, apical 2 teeth much the largest and unequal, basal 3 small and subequal. Epinotal spines short, directed upwards. Petiole flat ventrally and concave dorsally instead of convex.

Rugae present on the head, thorax, petiole, and postpetiole; surface of mandibles sparsely punctate.

Long, fine hairs of body considerably more numerous. Color darker, gaster fusco-testaceous.

Male: Length 2.7 mm.

Head trapezoidal; mandibles very small, 2-dentate, protruding; antennae long. Thorax large, scutum of the mesonotum incrassate, overarching the pronotum; posterior face of the epinotum smooth and descending in an obtuse angle. Petiole clavate, 0.32 mm. long, 0.14 mm. high, node not distinct from pedicel, the anterior end being 0.4 the maximum height of the posterior end, dorsal surface flat, rising evenly to rounded posterior end, ventral surface very slightly convex anteriorly. Postpetiole with convex dorsal and flat ventral surface. Gaster small, ovate, flat dorsally; genitalia retracted, volsella as illustrated (Fig. 14 A). Legs long and very slender.

Surface of head punctate, dull, opaque; of anterior region of thorax and gaster smooth, shining, translucent; of posterior region of thorax, petiole, and postpetiole punctate, somewhat shining.

Hairs of head long, rather fine, dense; of remainder of body and appendages shorter, scantier, and inclined. Appressed pubescence on antennal funiculi and tarsal joints.

Color of dorsal surface of head dark brown, much paler ventrally, posteriorly, and on mandibles; remainder of body, antennae and legs pale yellow, deepening to light brown on dorsal surface of thorax and on pedicel.

Described from a large colony consisting of many workers and six queens taken by myself in the Limones Seboruco, Soledad, Cienfuegos, Cuba, August 22, 1933. The colony was under rich humus in a depression on a limestone ledge in the dense shade of the forest. The male was collected in sweepings nearby in the same forest August 30.

This species belongs to the *Crematogaster victima* F. Smith — *C. minutissima* Mayr group. From the type of *C. victima* subsp. *missouriensis* Pergande the worker differs in its smaller size, less robust stature, shorter 1st funicular joint, lack of distinct meso-epinotal notch, shorter epinotal spines and in distinctly narrower gaster. From *C. victima* subsp. *cubaensis* Mann the workers differs in the possession of 4 instead of 5 mandibular teeth, greater length of the terminal funicular joint and narrower gaster. From *C. minutissima* the worker differs in having the mandibles smooth instead of striate, the clypeus and thorax without the longitudinal carinae and in having the postpetiole transversely elliptical instead of ovate; the average size is smaller. From *C. victima*, typical form, the female differs in smaller size, the absence of basal striations on the mandibles, the presence of clypeal carinulae and in the transversely elliptical postpetiole; from *C. victima* subsp. *cubaensis* the female differs in much larger size. From *C. minutissima* the female differs in distinctly smaller size, in having the epinotal spine more obtuse and directed upward instead of backwards at right angles to their insertion, the mandibles punctate instead of striate, and in the wholly fuscous-testaceous color of the gaster.

*Rogeria (Rogeria) scabra*, n. sp. (Fig. 2)

Worker: Length: 2.3-2.4 mm.

Head, including mandibles, longer than broad, posterior margin feebly impressed, sides slightly convex; antennal carinae slightly divergent, in the form of elongate slightly raised lobes; median part of the clypeus raised, extending as a narrow lobe which is bordered on each side by a conspicuous, infuscated carina; mandibles narrowly triangular, bearing on the obtuse cutting edge four blunt denticles basally

and two larger teeth apically, the distal one larger; antennal scapes falling short of reaching the occipital corners by a distance of over twice their distal diameter, club of the antennæ 3-jointed, the terminal joint 3 times the length of the penultimate joint and about equal in length to the 8 preceding joints together, 1st joint of the funiculus equal in length to the 4 following joints together. Thorax from the side evenly convex, from above ovoid, sides convex, teeth of the epinotum acute, straight, slightly divergent, about  $1/3$  shorter in length than the distance between them, face of the epinotal declivity flat. Petiole clavate, with subcylindrical peduncle and evenly rising rounded node; from above circular in outline. Postpetiole globular, from above about  $1/4$  broader than the petiole, from the side about  $2/3$  as high as the petiole. Gaster elliptical. Legs of medium length. Surface of head shining, coarsely reticulate-rugose, forming longitudinal lines on the front and anterior part of the sides; surface of thorax shining, coarsely reticulate-rugose, epinotal declivity reticulate; petiolar peduncle reticulate, node coarsely and rather irregularly reticulate; surface of postpetiole and gaster smooth and shining, microscopically punctate; appendages shining, sparsely punctate.

Hairs of head, mandibles, antennal scapes, and thorax short, fine, pointed, inclined, and moderately abundant; pedicel with a few long hairs, gaster and legs with numerous fine hairs of moderate size, directed apically. Pubescence moderate, confined to the funicular and tarsal joints.

Color rufo-ferruginous, antennae and legs light ferruginous.

Female: Length 2.8 mm.

Similar to the worker, with the usual sexual differences, sculpture of the body somewhat finer. One of the females is distinctly lighter in color.

Described from one female taken by Dr. P. J. Darlington, June 1929, and 3 workers and one female taken by myself from material run through the Berlese funnel from the Limones Seboruco, August 4, 1933, all from Soledad, Cienfuegos, Cuba.

This form is separated from *R. curvipubens* Emery, *R. germaini* Emery and *R. foreli* Emery chiefly by the irregularly and coarsely reticulate dorsal surface of the node of the petiole. It is much darker than *curvipubens* and without the long hairs of *germaini*. The Antillean specimens of *R. cur-*

*vipubens*, to judge from a femal and two workers from the Bahamas in Dr. W. M. Wheeler's collection (and from Emery's statement that the Bolivian specimen of the original description is darker than the St. Thomas, V.I., specimens), are much the lightest, being pale ferruginous instead of the rufo-ferruginous color of the other known forms. *R. curvipubens* is also the smallest, the type female given as 2 mm. long and the worker types from  $1\frac{2}{3}$  —  $1\frac{3}{4}$  mm. long. Emery separates *R. germaini* from *foreli* and *curvipubens* chiefly on the basis of coarser sculpture and greater and longer pilosity. He separates *foreli* from *curvipubens* on the basis of the finer sculpture and total absence of straight hairs. *R. foreli* is the only one of the three not having the dorsal surface of the petiolar node smooth, the node being punctate both laterally and dorsally.

The relative status of Emery's three forms and the one here described awaits the discovery of more material; they may eventually be considered forms of one neotropical species. From *Rogeria belti* Mann it differs in lacking the mesoëpinotal suture in distinctly smaller size, in having shorter hairs, and in considerably lighter color of the body.

*Strumigenys (Strumigenys) tridens*, n. sp. (Fig. 3)

Worker: Length 2.6-2.8 mm.

Head cordate, deeply but smoothly excised at the posterior margin, occipital corners rounded, sides converging to the antennal insertions, from thence to the mandibles slightly convex; eyes protruding from the sides, more directed laterally than forward; clypeus with slightly convex anterior margin, slightly concave sides, and rounded posterior angle of 90°; mandibles narrow, about 0.57 length of rest of head, sides subparallel when closed, with two long subequal and subparallel apical teeth on either side of a median tooth of about half their size and two mandibular teeth, the proximal tooth (the longer) being closer to the apex than to base of mandibles and the distal tooth about as close to the dorsal apical tooth as its length; antennal scapes extending about  $\frac{2}{3}$  the distance from eyes to occipital corners, slender, sides subparallel, gently bowed inwardly at base; 1st joint of funiculus 1.5 times length of 2nd and 3rd together and shorter than 4th alone, 2nd joint distinctly longer than the 3rd and about as broad as long, 3rd joint broader



than long, 4th joint 1-2/3 times length of 2nd and 3rd together, terminal joint slightly longer than the preceding four joints together. Thorax in profile with distinct mesoëpinotal notch, of two subequal gentle convexities of the thorax and epinotum, from above with angular humeri and posteriorly converging convex sides to the subparallel sides of epinotum; epinotal spines short, obtuse, directed upwards and backwards, from above subparallel; epinotal lamina low and inconspicuous. Petiole clavate with evenly rounded node. Postpetiole hidden by the spondiform appendages except on the dorsal surface, roughly elliptical, higher than long. Gaster ovate, about as long as thorax. Legs long and slender.

Surface, (except on mandibles, antennal funiculi, gaster and tarsal joints) reticulate, somewhat shining; mandibles and gaster smooth and shining, gaster exhibiting no basal striae; funiculi and tarsal joints smooth.

Hairs of head inconspicuous, clavate, short, except for a fringe of long clavate hairs on anterior margin of clypeus; hairs of thorax short, scanty, clavate; four conspicuous bristles on postero-dorsal region of head and one on each humeral angle of thorax; hairs of pedicel and gaster long, fine, curved; about 9 slightly clavate bent hairs fringing outer margin of scapes; remainder of antennae with fine, simple, appressed hairs; hairs of legs simple, appressed. Spongiform appendages well-developed, the sides of the pedicel being covered, a dorsal strip extending across posterior part of petiolar node, and the postpetiole being covered except for the dorsal surface.

Color, except on gaster, ferruginous; gaster bright testaceous, lighter at apex.

Described from 27 workers collected by Dr. W. M. Wheeler at Barro Colorado Island, Canal Zone, July 29, 1924. These were part of a colony with brood found in the rotten wood at the base of a dead branch several feet from the ground on a large *Inga* tree. *Strumigenys* could live in such an arboreal habitat probably only under the humid conditions of the tropical rain forests; those collected in the temperate regions and most of those in tropics have been terrestrial, frequently in rotten wood on the ground.

This species is closely related to *S. rogeri* Emery from which it differs chiefly in size, color, absence of dorsal thoracic carinulae and greater development of the spongiform

appendages. It is named from the trident form of the apical teeth.

*Strumigenys* (s. str.) *ludia* Mann *tenuis*, n. subsp.

Worker: Length 3.0 mm.

A slightly larger and darker form of the Honduran species. The proportion of the mandibles to the remainder of the head is slightly larger, the total length of the head being also distinctly greater. The terminal joint of the funiculus is of about the same length as the remainder of the funiculus, while in the cotypes of the species available the terminal joint is longer. Color of body ferruginous, margins somewhat infuscated, appendages somewhat lighter.

Described from three workers, two lacking the post-petiole and gaster, in Dr. W. M. Wheeler's collection, taken from the stomach of the tree toad, *Dendrobates tinctorius* (Schneider) at Tuli Creek, near San Mejuel, Nicaragua, November 1916, by C. R. Halter. The toad was one of two captured among the leaves of the forest floor about the creek during a shower at 10 A. M. These toads contained the following ants (Noble, 1918): *Wasmannia auropunctata* (Roger), this *Strumigenys* and *S. elongata* subsp. *nicaraguensis* n. subsp., *Trachymyrmex* sp., *Leptogenys* (*Lobopelta*) sp., *Ponera* sp., *Pheidole* spp., *Solenopsis* sp. and *Rhopalothrix* (*Octostruma*) *equilatera* n. sp.

*Strumigenys* (s. str.) *elongata* Roger subsp.  
*nicaraguensis*, n. subsp.

Worker: Length 2.1-2.2 mm.

Sides of the head, between the posterior angles and the antennal insertions, in the form of two subequal shallow convexities separated by an obtuse projection; posterior angle of the clypeus acute; mandibles slightly shorter than remainder of head; antennal scapes extending barely to the beginning of the occipital angles. Dorsolateral margins of thorax carinate, humeral angles acuminate; epinotal spines forming a much smaller angle with the dorsal surface of the epinotum.

Color of body dark brown, legs and antennae somewhat lighter.

In other characters resembling the typical form.

Described from two workers, in Dr. W. M. Wheeler's collection, taken from the stomach of a tree toad, *Dendro-*

*bates tinctorius* (Schneider) from Tuli Creek, near San Mejuel, Nicaragua, November 1916, by C. R. Halter. The toad was captured at 10 A. M., during a shower, among the leaves of the forest floor surrounding the creek.

This subspecies varies from the typical form described from Panama in 1863 more than does *S. imitator* Mayr of Brazil. In respect to the proportions of the mandibles to the remainder of the head, they form a close series. *S. imitator* has been separated on the basis of lacking the median pronotal carina, hardly sufficient reason for specific rank unless accompanied by other distinct differences. The carinae in the other forms are of variable distinctness. Two workers referred to *imitator* in Dr. Wheeler's collection have very slight median pronotal carinae and are otherwise very similar to *elongata*. In fact, Mayr concludes his original description with the following (p. 573): «Obschon diese Art mit der Beschreibung von *Strumigenys elongata* Rog. so ziemlich übereinzustimmen scheint, so halte ich es in Anbetracht mancher unklarer Stellen derselben für besser, der brasilianischen Art einen eigenen Namen zu geben, bis es mir möglich ist, sie mit der Type von *Strumigenys elongata* zu vergleichen.»

Because of the general close resemblance of the three forms I would therefore reduce *S. imitator* Mayr to a subspecies of *S. elongata* Roger.

*Strumigenys* (s. str.) *clavata*, n. sp. (Fig. 8)

Worker: Length 2.0-2.1 mm.

Head cordate, moderately excised at the posterior margin, sides slightly convex posterior to eyes, converging anteriorly; eyes visible from above; antennal scrobes wide, length of scapes, moderately deep; clypeus with approximately straight anterior margin and rounded posterior angle. Mandibles 0.60 length of head, parallel when the apical teeth are just touching; outer margin slightly convex at the base, continuing in a straight line; bending inwardly at right angles to form the apical teeth; incrassate on inner median margin, forming concavities at base and apex; two stout apical teeth with irregular tubercles between; a series of six denticles along apical third of inner margin, the basal ones shortest. Antennal scapes reaching a point about halfway between eyes and occipital corners, stout, incrassate medially, inner surface concave, outer surface convex, the scape bent evenly

but abruptly towards the base; 1st joint of funiculus one-fourth longer than 2nd and 3rd together, 3rd joint about as broad as long, terminal joint of funiculus longer than the preceding joints together. Thorax, in profile, convex with well-marked mesoëpinotal suture; epinotal declivity on each side with a lamina which terminates dorsally in a strong backwardly and upwardly directed tooth, the teeth being longer than the distance between them. Petiole clavate; with long, narrow peduncle and abruptly, but evenly, rising rounded node which is roughly circular, seen from above. Postpetiole, in profile, convex, slightly higher than broad; from above, transversely elliptical. Gaster from above ovoid, with con-

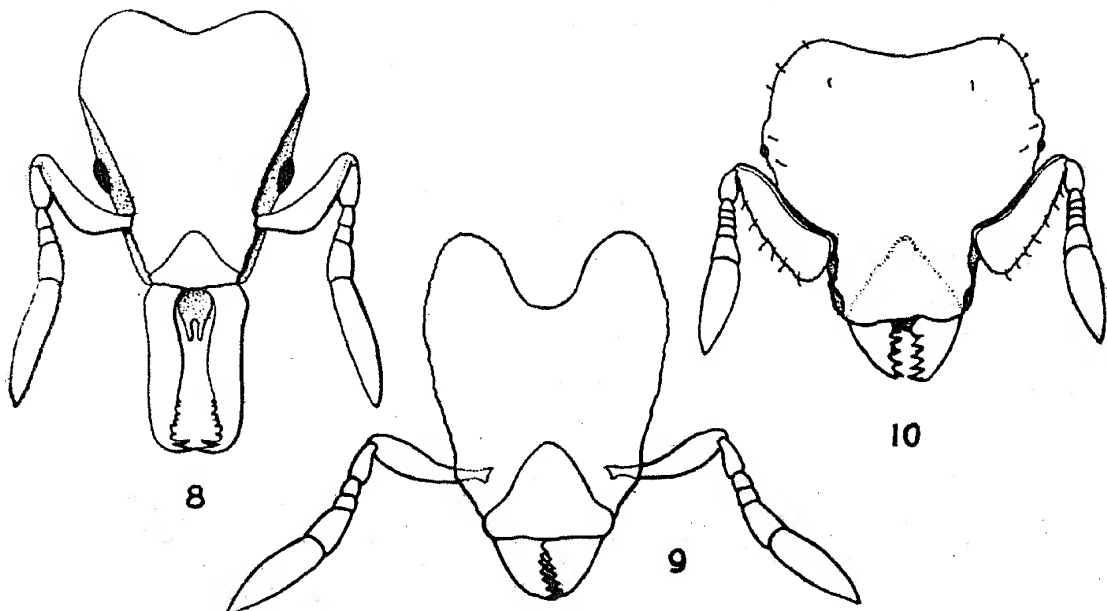


Fig. 8. *Strumigenys* (s. str.) *clavata* n. sp., outline of head of worker. — Fig. 9. *Codionymrmer excisus* n. sp., outline of head of worker. — Fig. 10. *Rhopalothrix equilatera* n. sp., outline of head of worker, showing clavate hairs.

cave anterior margin in which the post-petiole fits.

Surface of body (except gaster), legs, and antennal scapes coarsely reticulate; 1st gastric segment finely striate, becoming coarser basally, with faint reticulations.

Hairs various: long and clavate on body, antennal scapes and legs; about 9 long, squamate hairs fringing outer margin of clypeus and bent medially; short and squamate on head and fringing clypeus. Pubescence subappressed, largely confined to antennal funiculi and tarsal joints. Spongiform appendages much reduced.

Color light ferruginous, gaster somewhat darker.

Described from 3 workers, one being headless, in Dr.

W. M. Wheeler's collection, taken at Cacao Trece Aguas, Alta V. Paz, Guatemala by Schwarz and Barber.

This species resembles *S. subdentata* Mayr in general habitus but differs in greater number of mandibular denticles, greater length of antennal scape, shorter terminal funicular joint, and in the shape of the petiole.

*Strumigenys* (s. str.) *mustelina*, n. sp. (Fig. 11)

Female: Length 1.8-1.9 mm.

Head narrowly cordate, slightly impressed at posterior margin, occipital corners evenly rounded; sides at a point slightly in front of a level with the apical ocellus produced sharply inward to a point above the anterior border of the eyes, from thence to the mandibles subparallel; antennal scrobes in the form of a broad, shallow impression the length of the scape; clypeus roughly triangular, with rounded apex, slightly concave sides, and somewhat rounded anterior border; mandibles converging, narrowing to apex where bent sharply inward forming the apical teeth; apical armament of two stout teeth between which are four minute denticles; the apical 0.63 of the inner mandibular border armed as follows, proceeding apically: four small denticles, one stout tooth which is somewhat longer than the apical teeth, four denticles; antennal scapes incrassate medially; 1st joint of funiculus incrassate, medially; 1st joint of funiculus incrassate, twice as long as 2nd and 3rd together; joints 2 and 3 broader than long, the 3rd being transversely rectangular; 4th joint longer than 2nd and 3rd together, though shorter than the 1st joint; terminal joint longer than the preceding funicular joints together and equal to length of entire scape. Thorax two thirds as high as long, epinotal declivity with a lamina on each side armed dorsally with an obtuse tooth and ventrally with a low lobe. Petiole clavate, long peduncle sub-cylindrical, node rising abruptly but evenly; node from above flat and transversely rectangular. Postpetiole in profile ellipsoidal, long axis vertical, from above, transversely elliptical. Gaster ovoid.

Surface of body, except gaster, reticulate; gaster translucent, shining, smooth except for striations on basal third of first gastric segment.

Hairs of body as follows: sparse, upright, fine, clavate hairs on body, most numerous on apex of gaster; a

fringe of long, squamate hairs on anterior margin of antennal scape; short squamate hairs on head and fringing anterior margin of clypeus; subappressed clavate hairs on legs. Pubescence scanty, thickest on antennal funiculi and tarsal joints. Spongiform appendages small but well developed.

Color light ferrugineous, gaster darker.

Described from four winged females, in Dr. W. M. Wheeler's collection, from San Rafael, Jicoltepec, Vera Cruz Province, Mexico.

Resembling *S. eggersi* Emery in general appearance but with much shorter mandibles, translucent instead of opaque gaster, and in other ways.

This species is named from the similarity in tooth structure to the weasel family, Mustelidae, in Mammalia. The four minute denticles between the two apical teeth resemble the four small incisors and large canines which are a unique character of the weasels.

*Strumigenys* (s. str.) *eggersi* Emery *infuscata*,  
n. subsp.

Female: Length 2.0 mm.

Posterior corners of head rounded; mandibles  $\frac{2}{3}$  length of remainder of head, 6 denticles on distal half of inner surface of mandibles, regularly arranged linearly, the distal denticle very close to the two apical teeth. Gaster finely reticulate-punctate. Color of head and thorax dark brown, gaster almost black, mandibles and legs testaceous.

Other characters as in the typical form.

Worker: Length 1.7-1.8 mm.

Characters as in the female.

Described from a female taken by myself in humus, which had been run through a Berlese funnel, from the Limones Seboruco, August 4, 1933 and from 5 workers taken by D. M. Bates and G. B. Fairchild in July, 1932, all from Soledad, Cienfuegos, Cuba.

This is a decidedly larger and darker form of *S. eggersi*, differing also in the number of denticles on the mandibles. *S. eggersi* Emery var. *cubaensis* Mann, described from Cienfuegos, Cuba, lacks the denticulation of the inner surface of the mandibles entirely and has the gaster opaque while in this form the gaster, though finely reticulate-punctate, is fairly smooth and shining.

*Strumigenys eggersi* Emery *berlesei*, n. var.

Female: Length 1.7 mm.

Mandibles not quite  $2/3$  length of rest of head; along distal third of mandible 3 distinct minute teeth regularly arranged linearly. Gaster microscopically punctate, fairly smooth and shining. Head ferruginous, thorax and abdomen dark brown, appendages somewhat lighter.

Type: One female taken by myself from material from a compost heap which had been run through the Berlese funnel, from the Harvard Botanical Gardens, August 29, 1933.

Differing from the previously described forms in the number and arrangement of the mandibular teeth, from the subsp. *infuscata* n. subsp. in color and size and from the var. *cubaensis* Mann in the character of the gastric surface.

*Strumigenys* (s. str.) *louisianae* Roger

A critical study of specimens referable to this species from Guatemala and Costa Rica (in Dr. W. M. Wheeler's collection) and from Cuba (my collection) together with the cotypes of the variety *obscuriventris* Wheeler from Puerto Rico and specimens from Texas and Florida of the typical form reveal slight but distinct differences.

Using an ocular micrometer and a compound microscope the absolute measurements of the length of the head, of the mandibles and of the antennal funicular joints were determined for from 6 to 8 specimens of each form. Since the remaining characters of the workers are very similar, with the exception of those given, a description of the typical form is appended, which will serve as a general description of the subspecies here described.

Worker: Length, 2.2 mm.

Head cordate, moderately excised at posterior margin, occipital angles rounded, sides, from antennal scrobes, converging to clypeus; antennal scrobes broad and shallow; eyes visible from above; clypeus triangular, anterior margin straight; mandibles parallel, over half the length of remainder of head; outer margins at bases converging medially, at apex rounded medially forming apical teeth; inner margins converging proximally, diverging distally; apical teeth two, stout, slightly divergent, with two denticles between; one

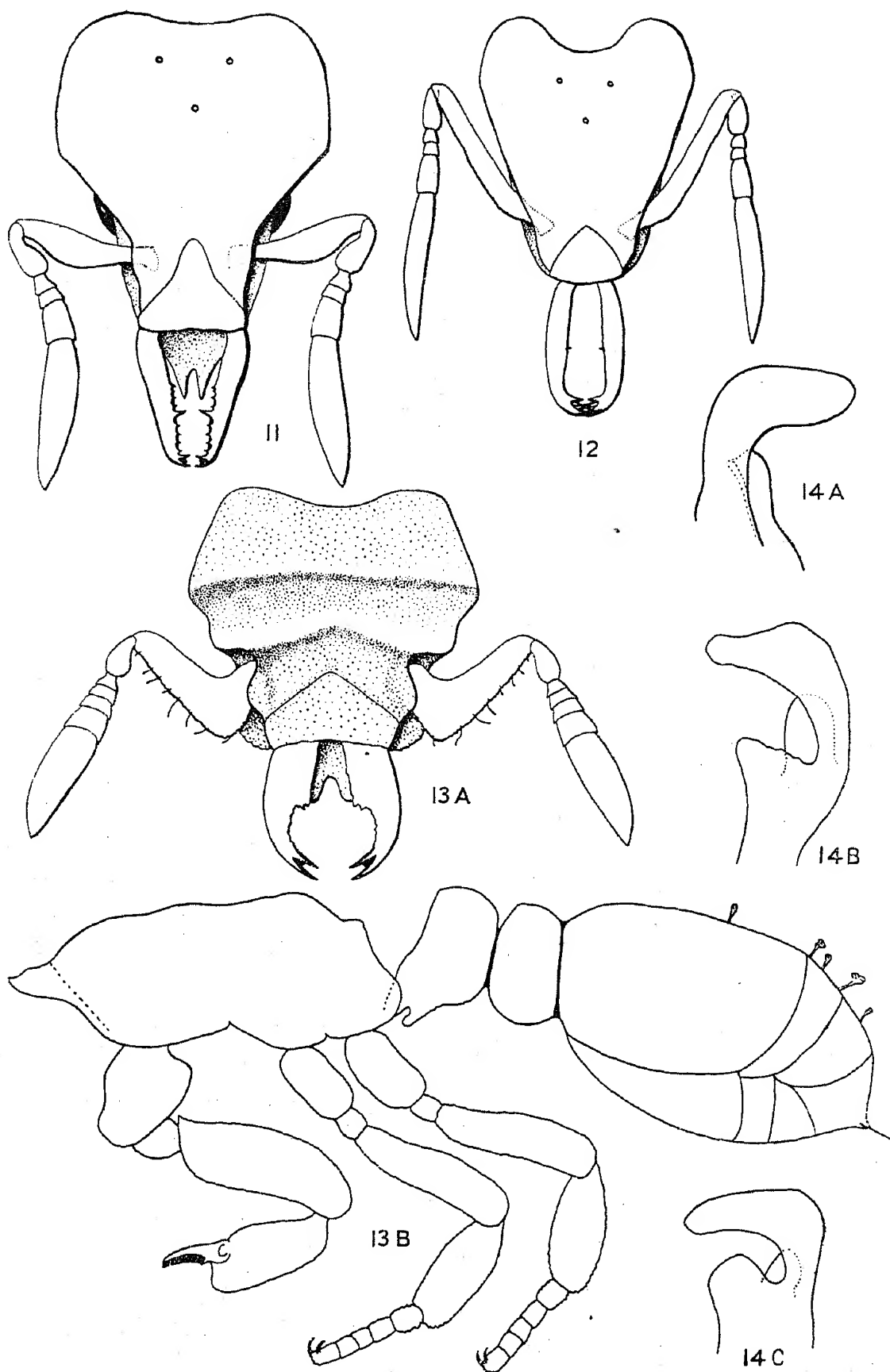


Fig. 11. *Strumigenys* (s. str.) *mustelina* n. sp., outline of head of female. — Fig. 12. *Strumigenys* (s. str.) *caribbea* n. sp., outline of head of female. — Fig. 13. *Heptastroma wheeleri* n. g. n. sp., worker; A, outline of head, showing transverse ridges; B, lateral outline of body. — Fig. 14. Volsellae of males: A, *Crematogaster barbouri* n. sp.; B, *Strumigenys* (s. str.) *cordovensis* Mayr *dolichognatha* n. subsp.; C, *Strumigenys* (*Cephaloxys*) *depressiceps* n. sp.



subapical tooth, size small, about half the length of apical teeth, slender, closer to the apical teeth than its length; antennal scapes extending about halfway between eyes and posterior corners of head, slender, evenly bent towards their bases; first joint of funiculi longer than the 2nd and 3rd together and longer than the 4th, terminal joint longer than the preceding funicular joints together. Thorax in profile evenly convex to the distinct notch of the mesoepinotal suture; dorsal surface of epinotum flat, posterior declivity concave, epinotal spines long, acute, slightly divergent and upwardly directed, a translucent lamina on each side of the epinotal declivity which is the height of the spines dorsally and narrows ventrally to a medium height. Petiole clavate, produced on sides of peduncle as a medial low prominence, node rising evenly from the peduncle, convex dorsally. Postpetiole from above transversely elliptical, slightly concave at posterior margin, almost twice as broad as petiolar node. Gaster ovate. Legs long and slender.

Surface of body subopaque, reticulate-punctate, gaster with basal half of 1st segment rather coarsely striate, finely reticulate-punctate between.

Hairs of head squamate; fringe of squamate hairs on anterior margin of clypeus; margins of antennal scapes with clavate-squamate hairs; sub-erect long, clavate hairs on thorax, petiolar node, postpetiole and gaster; a few long recurved hairs on thorax; subappressed clavate hairs on legs; spongiform appendages small.

Color ferruginous, legs and antennae somewhat lighter.

Average length of the head of 7 specimens from Texas and Florida: 0.82 mm.; of the antennal funiculus: 0.45 mm.; proportions of the mandibles to the remainder of the head 0.57:1.

*Strumigenys* (s. str.) *louisianae* Roger *soledadensis*, n. subsp.

Worker: Length of head 0.79 mm.; of antennal funiculus 0.44 mm.; proportion of mandibles to remainder of head 0.54:1. Epinotal laminae reduced to mere carinae. Color dark ferruginous.

Female (deälated): Length 2.6 mm.

Length of head with mandibles 0.83 mm.; of antennal funiculus 0.46 mm., of terminal joint 0.25 mm.; proportion of mandibles to remainder of head 0.56: 1.

General structure as in the worker, except for usual thoracic differences, and the following: epinotal spines acute, subparallel, the lateral laminae much narrowed, not extending more than half way along the spine, produced ventrally as an acute low tooth. Petiolar peduncle produced on the side medially as a sharp angle; petiolar node from above transversely rectangular, narrow, dorsal surface flat; postpetiole from above transversely narrow-elliptical, somewhat concave anteriorly and straight posteriorly.

Basal striae of 1st gastric segment extending over nearly half the segment.

Types: A number of workers and one female collected by myself on three days, Aug. 11, 15 and 29, 1933, in the Harvard Botanical Gardens, Soledad, Cienfuegos, Cuba, by means of the Berlese Funnel.

*Strumigenys* (s. str.) *louisianae* Roger *guatemalensis*, n. subsp.

Worker: Length of head 0.78 mm.; of antennal funiculus 0.41 mm.; proportion of mandibles to remainder of head 0.53:1. Color ferruginous.

Described from six workers taken at Zacapa, Guatemala, Dec. 13, 1911, by Dr. W. M. Wheeler.

*Strumigenys* (s. str.) *louisianae* Roger *costaricensis*, n. subsp.

Worker: Length of head 0.89 mm.; of antennal funiculus 0.48 mm.; proportion of mandibles to the remainder of head 0.55:1. Epinotal laminae reduced to mere carinae. Color dark ferruginous.

Described from 9 workers taken at Cartago, Costa Rica, December 15, 1911, by Dr. W. M. Wheeler.

*Strumigenys* (s. str.) *louisianæ* subsp. *obscuriventris* (Wheeler)

*Strumigenys louisianæ* var. *obscuriventris* Wheeler, Bull. Amer. Mus. Nat. Hist. 24, p. 145. pl. xii, fig. 14 (1908) (worker)

Worker: Length of head 0.84 mm.; of the antennal funiculus 0.45 mm.; proportion of mandibles to remainder of head 0.45:1. Epinotal laminae reduced to distinct carinae. Color dark ferruginous, «gaster, except at the base, dark brown or black.»

*Strumigenys* (s. str.) *cordovens* Mayr  
*dolichognatha*, n. subsp.

Worker: Length 3.8-4.1 mm.

Head 0.92 length of rest of body. Mandibles slightly recurved distally to the middle (parallel in the species), 0.20 longer than head proper (0.12-0.15 in the species); distal mandibular tooth closer to the other than to apical teeth (closer to apical teeth in the species). Terminal joint of antennal funiculus shorter than the remaining joints together (longer in the species).

Surface of head finely reticulate-punctate, thinly vermiculate (more coarsely reticulate-punctate in the species); punctate on clypeus.

Hairs fringing clypeus anteriorly, sparse, short, clavate (abundant, longer, clavate-aquamate in the species); scape with 7 long hairs on outer margin, directed distad.

Male: Length 2.9 mm.

Head from the side roughly trapezoidal, truncated posteriorly; dorsal and ventral surfaces subparallel, narrowing anteriorly to mouthparts; eyes large, hemispherical; the three ocelli transparent, prominent, the apical one directed forward, the basal two directed laterally; clypeus from the side convex, separated from mandibles; antennae 13-jointed, long and slender; scapes stoutly clavate with straight outer margin, about 1 and 1/2 times the length of the 1st funicular joint; 1st funicular joint barely over half the length of the 2nd funicular joint; this 2nd joint longer than the 3rd; joints 4-12 of funiculus gradually increasing in length distally; penultimate joint 2/3 the length of the terminal joint. Thorax seven-tenths as high as long; cervical region small, connecting antero-ventral angle of thorax with postero-ventral angle of head; scutum of mesonotum, in profile, convex; scutellum convex with an abrupt drop posteriorly; epinotum slanting abruptly downward, bounded on each side by a lamina which ends dorsally in an acute tooth directed backward. Petiole clavate, with long peduncle rising gradually into the rounded node which, from above, is roughly circular. Post-petiole, from above, transversely elliptical, from the side 0.55 higher than broad. Gaster ovate. Volsella of the male genitalia as illustrated (Fig. 14 B); serrations on each valve of penis about 20, none at apex. Legs long and slender. Wings with the costal cell as broad distally as the aptero-

stigma; discoidal vein thick, forming a conspicuous Y with the cubital; marginal vein prolonged proximally past the transverse cubitus by a length equal to that of the apterostigma.

Surface of body, except gaster, somewhat irregularly reticulate; gaster smooth and shining without basal striæ.

Body and appendages thickly covered with short, fine, appressed hairs and longer, subappressed to merely bent hairs; occasional long, erect hairs on dorsum of body; spongiform appendages on the petiole and postpetiole well developed but small.

Color of body dark brown, darkest on the head, much lighter on petiole and postpetiole; tip of gaster light brown; external genitalia dirty white to pale yellow; legs light brown, antennæ somewhat darker; wings hyaline with a brownish cast.

Described from 8 workers and 6 males, part of a large colony, taken in the cavity of a rotten log lined with gray fungus at Kartabo, British Guiana, July 25, 1920 by Dr. W. M. Wheeler. As Kennedy (Kennedy and Schramm, 1933), who has studied the mouthparts of *S. dietrichi* Smith and finds them very delicate, has suggested, *Strumigenys* may use fungal mycelium for food.

*Strumigenys* (s. str.) *ferox*, n. sp. (Fig. 6)

Worker: Length 4.6 mm.

Head cordate, 1.28 length of gaster, posterior margin with a deep rounded excision, occipital angles evenly rounded, lateral margins, posterior to eyes, straight, in front of eyes shallowly concave to a point just below the antennal insertion, from thence shallowly convex to the mandibular insertions; antennal scrobes very slight and extending hardly beyond eyes; eyes protruding from lateral margins, directed forward; frontal carina concave and narrow above antennal insertions, widened and convex in front of insertions, anteriorly forming a notch with sides of clypeus. Clypeus triangular, with straight anterior margin and rounded basal angles. Mandibles short, stout, arcuate, the arc ending evenly in two strong divergent apical teeth with an irregular tubercle between; a strong sub-median mandibular tooth and a slightly shorter tooth half way between the apical and the submedian tooth. Antennal scapes with subparallel sides, narrowed towards antennal insertions, long and slender but not extending to

occipital angles; 1st joint of funiculus 1.5 times length of 2nd and 3rd together, joints 2 and 3 subequal, penultimate joint  $1/4$  longer than 2nd and 3rd together, terminal joint equal in length to joints 2 — 4 together. Pronotum in profile convex; from above, margins crenulate in two shallow scallops; mesonotum, in profile, flat, at a much lower level than the pronotum; mesoëpinotal suture deeply notched dorsally; epinotal declivity on each side with a high lamina ending dorsally and ventrally in an acute, backwardly directed tooth; concave between; dorsal teeth shorter than the width of the space between them. Petiole clavate, peduncle longer than node; node rising evenly, with convex dorsal surface. Postpetiole longer than the petiolar node; from above, transversely elliptical; from the side, with convex dorsal surface. Gaster, from above, ovate, composed largely of the 1st gastric segment which is nearly circular in outline, being truncated at base and apex; the following gastric segments forming a conic apex. Legs long, slender; femora of hind legs 1.5 times longer than the tibiae; tarsi 1.33 times longer than the femora.

Surface of body (except gaster) finely granulate; abdomen strongly shining and smooth, basal striae very short and confined to the basal border. Antennal scapes and legs finely granulate; mandibles smooth and shining.

Hairs on head numerous, short, and clavate, fringing anterior border of clypeus; about 9 long, clavate hairs on outer margin of scapes, directed distally; cervical region of thorax with a few appressed clavate hairs, hairs of remainder of thorax scanty, short, appressed and clavate; node of petiole and the postpetiole with a few long, suberect bristles; gaster hairless except at the conic apex which has long backwardly directed hairs. Pubescence confined largely to antennal funiculi and tarsal joints, gaster with scattered minute pubescence. Spongiform appendages well developed between the thorax and gaster, chiefly on the ventral and lateral surfaces.

Color of body dull ferruginous except for shining dark brown gaster; mandibles, antennae, and legs lighter.

Described from one worker in Dr. W. M. Wheeler's collection collected by himself July-August 1920 at Kartabo, British Guiana.

This species, with its nearest related form, *S. godmani* Forel, from Panama, appears to be the largest *Strumigenys* yet described from the New World. It resembles *S. godmani* also in arcuate mandibles but differs considerably (according to Forel's original description and accompanying illustration) in having less convex lateral margins of the head, the posterior margin of the head more deeply excised, more slender mandibles and teeth, the first mandibular tooth also lacking the lamina, and in having the postpetiole transversely elliptical instead of longitudinally elliptical.

*Strumigenys* (s. str.) *caribbea*, n. sp. (Fig. 12)

Female: Length 1.9-2.0 mm.

Head cordate, posterior margin broadly excised, occipital angles rounded, sides of head evenly converging from the posterior end of the antennal scrobes to above the antennal insertions, from thence to the clypeus slightly convex; antennal scrobes fairly deep, covering base of scapes; clypeus in the form of an equilateral triangle with slightly convex sides; mandibles slightly over half the length of remainder of head, with subparallel sides converging at base and apex; the two apical teeth at right angles to the mandibles, stout, long, and acute; a stout subapical and a small median mandibular tooth completing the armament; proximal fourth of antennal scape bent inward at a 40° angle, slightly incrassate at the bend and distad; 1st joint of funiculus as long as 4th, about 1.5 times length of 2nd and 3rd together, joints 2 and 3 about as broad as long, terminal joint one-third longer than the preceding joints together. Thorax of usual shape; epinotal declivity on each side with a low lamina terminating dorsally in an acute, diverging, and upwardly directed spine, ventrally in an obtuse tooth. Petiolar peduncle stout, node evenly rising and, from above, transversely elliptical in outline. Postpetiole, from above, transversely ellipsoidal in outline with parallel anterior and posterior sides. Gaster ovate in outline, 1st gastric segment forming about 3/4 of the dorsal surface. Legs long and slender.

Surface of head, scapes, thorax, and petiole dull and rather deeply reticulate-rugose; postpetiole and gaster feebly reticulate and somewhat shining, basal 1/2-1/3 of first gastric segment coarsely striate; mandibles smooth and shining; legs reticulate.

Hairs on head clavate to clavate-squamate; on clypeus squamate, obscuring the anterior margin; on the mandibles sparse, long, directed apically; 7 long and finely pectinate hairs on the outer margin of the antennal scapes, bent medially and mostly directed towards the nearest end; hairs on the thorax and gaster clavate, sparse; legs with a few long clavate hairs bent near the base and directed distad. Pubescence fine and appressed, most abundant on the antennal funiculi and tarsi.

Color of body ferruginous, antennæ and legs somewhat lighter.

Worker. — Length: 1.6-1.7 mm. Similar to the female with the usual thoracic differences.

Described from two deälated females taken by myself from debris of a compost heap, which had been run through a Berlese funnel, from the Harvard Botanical Gardens, August 15, 1933; and from seven workers taken by W. S. Creighton November 4, 1927, all from Soledad, Cienfuegos, Cuba.

This species resembles *S. silvestrii* Emery from Argentina in general habitus.

*Strumigenys (Cephaloxys) studiosi*, n. sp. (Fig. 5)

Worker: Length 1.9-2.1 mm.

Head cordate, moderately excised at posterior margin and with rounded occipital corners, sides converging to mandibles, produced slightly outward as the lobes of the antennal scrobes above the insertions; clypeus very slightly convex, converging posterior sides enclosing a rounded angle of about 50°, the anterior border being produced as a convex apron covering base of mandibles; inner border of exposed part of mandibles with about 9 acute teeth of variable height, the two on either side of the median one being highest, apex of mandible with several smaller teeth; antennal scapes extending less than 1/2 the distance between eyes and occipital corners, short and broad, less than 1/2 the width at the base as at the inwardly curved bend. 1st joint of funiculus about 1 1/2 times length of 2nd and 3rd together or 4th alone, 2nd joint broader than long, 3rd joint nearly twice as broad as long, terminal joint about 1/4 longer than the preceding 4 joints together. Thorax in profile with the pronotum convex, sloping mesonotum and



slightly convex epinotum; no distinct mesoëpinotal suture; thorax from above with sides of pronotum convex, posterior part of thorax about half as wide and with parallel sides; mesoëpinotal suture clearly indicated; epinotal declivity bordered on each side by a moderately high lamina which is dorsally prolonged as an acute spine; ventral to the spine the lamina is variably excised; from above the spines appear as long as the distance between them. Petiole from above with long, subcylindrical peduncle and subglobose node; from the side the subglobular node rises sharply but smoothly. Postpetiole from above transversely elliptical, about 1.4 the width of the petiole; from the side subglobular. Gaster ovate. Legs moderately long.

Surface of body rather coarsely reticulate-punctate, gaster finely so; basal  $1/3-1/2$  of the 1st gastric segment coarsely striate.

Hairs of body clavate, squamate and simple; short, subappressed, clavate hairs moderately abundant on head, less numerous, longer, and more erect on the rest of the body; 7-9 conspicuous, short, squamate hairs fringing anterior border of antennal scape; similar hairs fringing anterior margin of clypeus; short, fine, subappressed hairs on antennal joints and legs; interspersed on the legs are occasional longer and more erect clavate hairs. Spongiform appendages large and well developed.

Color of body ferruginous, legs and antennæ somewhat lighter.

Described from 5 workers taken by Dr. George C. Wheeler from the Sixaola River, Province of Limon, Costa Rica, August 4, 1924.

This species is related to *S. (Cephaloxys) margaritæ* Forel from St. Vincent W. I. It differs in the possession of higher epinotal laminae, more globular petiolar node, less coarsely sculptured gaster and in the much less numerous clavate hairs of the body.

*S. studiosi* («of the student») is dedicated to the discoverer under whom I formerly studied, Dr. George C. Wheeler, himself an earlier student of my present professor, Dr. W. M. Wheeler.



*Strumigenys* (*Cephaloxys*) *studiosi* Weber  
*epinotalis*, n. subsp.

Worker: Length 2.0-2.1 mm.

General characters of the typical form with the following differences: 9 acute teeth arranged along the inner margin of mandible, the two teeth on either side of the median one from 1.5 to 2 times longer than the others; several smaller and blunter teeth at the apex. 1st joint of funiculus about 1.5 times the length of the 2nd and 3rd together and about 1.25 times the length of the 4th joint, 2nd joint broader than long, the 3rd about 1.2 broader than long, terminal joint slightly longer than the preceding 4 joints together. Epinotal declivity bordered on each side by a high lamina, the postero-dorsal angle of which is prolonged as a sharp obtuse spine, the lamina being over half the height of the distance between them. Petiole from above about as wide in maximum width as it is long, the anterior margin slightly concave, the sides narrowing posteriorly, and the posterior margin transverse. Postpetiole from above transversely elliptical, half as long as broad. Surface of gaster and the dorsal surface of the postpetiole smooth and shining, microscopically and faintly reticulate.

Clavate hairs of gaster larger.

Color of body a darker ferruginous, gaster fairly dark brown.

Female (alate): Length 2.3 mm.

Similar to the worker, with the usual thoracic differences, except for the ferruginous gaster, which is more like in the typical form, though it is smooth and shining. Wings grayish hyaline.

Described from 1 female and 4 workers, one lacking the gaster, collected by Dr. George C. Wheeler from Talia Farm, Estrella Valley, Costa Rica, June 18, 1924.

*Strumigenys* (*Cephaloxys*) *membranifera* subsp.  
*simillima* Emery

One worker taken by Dr. Frank E. Lutz in Desecheo Is., W. I. (Feb. 18-20, 1914), very closely resembles the topotypic specimens in Dr. Wheeler's collection of *S. membranifera* Emery from Portici, Italy. *S. membranifera* subsp. *simillima* was described from St. Thomas, W. I. The

median post-clypeal impression is larger and more pronounced and the terminal joint of the funiculus is scarcely longer, instead of distinctly longer, than the basal four joints together. In these respects agreeing with Emery's description and illustrations of the subspecies. The head, however, is not more elongate and more narrowed anteriorly. Clavate hairs of the tip of the gaster, antennal scape, and legs and the spongiform appendages of the petiole and postpetiole more sordid, as in *S. membranifera* var. *marioni* Wheeler from Mississippi. These are pure white in the typical form.

Dr. W. M. Wheeler, in an unpublished manuscript, wherein he describes *S. membranifera* var. *marioni* from Mississippi and *S. membranifera* var. *williamsi* from Hawaii gives the status of this widespread species (there is a variety *santschii* Forel from Tunis): «The distinguishing characters of the various forms of *membranifera* are so slight that their precise taxonomic rank cannot be determined without additional material. Emery confesses that he would not have regarded *simillima* as a subspecies if the type had been taken in Europe. I am inclined to regard it as a mere variety like *santschii*, but if the geographical distribution instead of the slight and elusive characters of the four is stressed, they might all be regarded as incipient subspecies.»

Dr. Lutz informs me that Desecheo Island, which is a volcanic island twenty-odd miles off the Porto Rican Coast and between it and Santo Domingo, is uninhabited, partly because of the lack of water, and is quite barren. The ant was probably taken under a stone, there being no trees on the island. This second record for the subspecies likely indicates a different habitat, for the first specimen was probably taken in a locality of luxurious vegetation.

*Strumigenys (Cephaloxys) depressiceps*,  
n. sp. (Fig. 6)

Worker: Length 2.7 mm.

Head long, narrow, half the length of the rest of the body, sharply but smoothly excised at the posterior margin; occipital corners rounded laterally; lateral margins concave from a level with the vertex (above the eyes) to antennal insertions from whence slightly convex to mandibles; head in lateral view triangular, the dorsal and ventral surface enclosing an angle of about 15°, ventral surface nearly flat

and dorsal surface gently convex above the antennal insertions and again at the vertex; eyes in the lateral concavities, visible from above. Clypeus roughly diamond-shaped with rounded corners, anteriorly produced as a rounded apron covering base of mandibles. Mandibles short, thickened, with convex outer and concave inner margin which bears about eight slender acute teeth, distal teeth much the smallest; teeth followed basally by a rounded lamina. Antennal scapes short, extending about half way to posterior margin of head, thickened, with nearly straight posterior margin and convex anterior margin; first joint of funiculus longer than the two following joints together and about length of fourth joint; terminal joint longer than the preceding four, about one-sixth shorter than the scape. Thorax, in profile, evenly convex, without a mesoepinotal impression; from above, with convex sides narrowing to epinotum which is similarly convex; epinotal spines acutely triangular, slightly divergent, shorter than the space between them. Petiole from the side with slender peduncle; rounded node rising nearly perpendicularly, from above, circular. Postpetiole, from the side, with rounded dorsum, from above, transversely elliptical. Margins of thorax and pedicel tuberculate, from whence rise stiff hairs. Legs elongate, tarsi of hind legs about as long as femora.

Surface of body (except gaster), antennal scapes, and legs finely reticulate-punctate. Gaster smooth and shining except for basal striæ.

Body covered with three types of hairs: fine subappressed hairs which are abundant except on gaster; numerous, long, erect, sub-clavate hairs on dorsal surface of petiole, postpetiole and gaster (less numerous on sides and ventral surface of gaster); clavate hairs which, on legs are long and inclined distad, on margin of antennal scapes are bent, on head are short and erect, and which fringe the clypeus and are short and inclined anteriorly. Spongiform bodies well-developed though confined largely to between postpetiole and abdomen.

Color of body ferruginous, gaster darker; legs, antennæ and mandibles light brown.

Male: Length 2.6 mm.

Head plummet-shaped, from the side with dorsal surface in two convexities, a major convexity extending from the back of the head to the clypeus, a minor convexity of the

large clypeus; ventral surface flat, rounded posteriorly; eyes hemispherical, laterally placed, protruding; ocelli large, transparent, the two upper directed laterally, the apical forward. Antennæ 13-jointed, long, slender; scapes broadly elliptical, inserted at their bases upon a cephalic tubercle; first joint of funiculus slightly over one-half the length of the second, joints 2 — 12 subequal, longest distally, terminal joint 0.60 longer than 12th. Thorax 0.70 as high as long; cervical region small, at anteroventral angle of head, connecting head at its postero-ventral angle; in profile, irregularly convex, in three major convexities — scutum of mesonotum forming 0.40, scutellum, with abrupt drop posteriorly, forming 0.20, epinotum forming most of the remaining 0.40 of convexity; epinotal declivity bordered on each side by a low lamina, which terminates dorsally in a blunt tooth, ventrally in a low lobe. Petiole long, somewhat clavate with flat ventral surface, dorsal surface in two convexities, one low, forming dorsal surface of pedicel, the other high, forming the node which is evenly rounded and, from above, circular in outline. Postpetiole from above transversely elliptical, with slightly concave anterior border; nearly twice as wide as the petiolar node. Gaster, from above, ovate. Legs long and slender. Wings with the costal cell as broad distally as the apterostigma; discoidal vein thick, forming a conspicuous rounded Y with the cubital; marginal vein prolonged proximally past the transverse cubitus, nearly closing off a first cubital cell. The volsella of the male genitalia as illustrated (Fig. 14 C); about 14 serrations on each valve of penis, none at apex.

Surface of head, thorax, petiole, and legs finely reticulate; postpetiole and gaster smooth, shining.

Hairs of body long, fine, scanty, intermixed with more numerous fine short hairs; subappressed. Legs and antennæ covered with fine appressed hairs; somewhat longer and subappressed on the femora. Spongiform appendages small but well developed.

Color of head very dark brown, thorax ferruginous, petiole and postpetiole light brown, gaster dark brown, external genitalia dirty white to pale yellow; antennæ brownish, legs and mandibles light yellow; wings hyaline with a brownish cast.

Described from 6 workers and 6 males taken from the

cavity of a rotten log at Kartabo, British Guiana, July 19, 1920, by Dr. W. M. Wheeler.

*Strumigenys (Cephaloxys) alberti* Forel

Two workers from the Harvard Botanical Gardens, Soledad, Cienfuegos, Cuba are referable to this species. The teeth have not hitherto been described carefully and from one of the specimens mounted in balsam the following mandibular structure is clear: Three needle-like mandibular teeth along the distal 0.4 of the exposed mandible, the distal tooth (the shortest) hardly separated by the width of its base from the apical teeth; the teeth are separated from each other, by rounded lobes with parallel sides which are of about half the height of the teeth; between the proximal tooth and the clypeus are two more such lobes and at the base a rounded lamina, apparently of the same nature as the lobes and of about three times their width.

*Strumigenys alberti* Forel *guianensis*, n. subsp.

Worker: Length 2.1 mm.

Three workers from Kartabo, British Guiana, collected by Dr. W. M. Wheeler (July 19, 1920) represent a darker form with the following additional differences:

Dorsal surface of the thorax to the epinotum with a conspicuous median infuscated longitudinal carina; petiolar node rising smoothly instead of angularly from the peduncle; more numerous short recumbent clavate hairs on the dorsal surface of the head; color ferruginous, margins infuscated, first gastric segment darker.

*Strumigenys (Cephaloxys) alberti* Forel *longipilis*, n. subsp.

Worker: Length 1.9 mm.

A single worker in Dr. W. M. Wheeler's collection from Cayamas, Cuba (6.3), E. A. Schwarz collector, has a conspicuous thickening and lengthening of the long sparse hairs of the thorax, petiole, postpetiole and gaster. The hairs are bent irregularly in one or more curves and attain lengths of 0.2-0.3 mm. Other characters as in the typical form.

*Epitritus emmae* Emery

In a Berlese funnel collection which Mr. F. G. Walsingham of the Harvard Botanical Gardens, Soledad, kindly made for me in Dec. 1933, were six workers of this rare ant. It is interesting to note that no *Strumigenys* were in the collection, though represented in a collection made at the same place by myself in August.

*Codiomyrmex excisus*, n. sp. (Fig. 9)

Worker: Length 1.7 mm.

Head elongate, deeply excised at the posterior margin, occipital angles rounded, sides slightly convex opposite the temples, continuing in a straight line toward the antennal insertions, where again produced convexly in a low lobe; head, in profile, with convex dorsal surface; gular surface with a flat anterior segment beneath clypeus, rising suddenly posteriorly to a rounded ridge which descends gradually to the occipital border; head under the occipital angles consequently is but half the thickness under the clypeus and one third the thickness of the median part; posterior angle of clypeus rounded, anterior margin straight, covering base of mandibles, antero-lateral angles of clypeus in the form of a rounded lobe, clypeus otherwise in the form of an equi-lateral triangle. Antennal scrobes extending to a level with the vertex, of nearly the same width as the thickness of the sides; eyes small, not visible from above, situated at the median and thickest part of the head at the ventral edge of the antennal scrobes. Exposed part of mandibles triangular, as broad at the base as long; viewed from the side, incrassate; inner border serrate, of about six acute teeth, at the base with an acutely toothed lamina. Antennæ 6-jointed; antennal scapes clavate, gently convex anteriorly, concave posteriorly; 1st joint of the funiculus longer than the two following joints, 2nd joint about as broad as long, 3rd joint broader than long; terminal joint longer than the proximal 4 joints together. Thorax in profile convex; from above with convex pronotum, mesonotum narrower, with sub-parallel crenulated margins; epinotal sides parallel; epinotal spines acute, triangular, divergent, about equal in length to the distance between their bases. Petiole clavate, resing gradually and forming nearly a right angle with the dorsal sur-

face of the node which is nearly flat; seen from above the node is ellipsoidal, broader anteriorly. Postpetiole from the side with convex dorsal surface and deeply concave ventral surface; from above lunate, with rounded apices, the concave margin anterior. Gaster ovate, at the base produced on each side as a concave laminate lobe in contact with the postpetiole.

Surface of head, thorax, and dorsal surface of petiolar node longitudinally and irregularly rugose, petiole otherwise granulate; postpetiole smooth and shining; basal third of gaster lightly striate, remainder smooth and shining.

Hairs of body long and fine, sparsely distributed; no squamiform or clavate hairs. Spongiform appendages limited to vesicular thin masses on the lateral arms of the postpetiole, produced posteriorly and nearly meeting similar masses on the adjacent lobes of the gaster. Pubescence fine and appressed.

Color of body dark reddish brown, legs and antennae somewhat lighter.

Described from one worker in Dr. W. M. Wheeler's collection from Tuli Sreek, near San Mejuel, Nicaragua taken by C. R. Halter November 1916 from the stomach of a tree toad, *Dendrobates tinctorius* (Schneider). The toad was captured among the leaves of the forest floor surrounding the creek about 10 a.m. during a shower.

This species differs from *C. thaxteri* Wheeler, *C. convexiceps* Santschi, and *C. nitens* Santschi chiefly by the deep excision of the posterior margin of the head. It is much smaller than *C. thaxteri* and has coarser and more irregular mandibular teeth. *C. nitens* has entirely different mandibles from the other forms. The spongiform appendages in the present specimen are thinner and less developed than in the previously described species.

*Rhopalothrix (Octostruma) equilatera*,  
n. sp. (Fig. 10)

Worker: Length 2.3 mm.

Head, excluding mandibles, slightly broader than long, including mandibles cuneiform in outline, being but feebly and broadly concave at the posterior border; occipital corners rounded, lateral margins of the head produced crenulately over the antennal fossae; eyes small, situated on the lat-



eral margins above the posterior end of the antennal fossæ; clypeus in the form of an equilateral triangle with a nearly transverse anterior margin, margins depressed, not sharply delimited; mandibles nearly triangular, with a series of 4 equal teeth and several denticles between, at the base with a rounded lamella; antennal scapes at the base  $3/8$  as broad as long, narrowed at the apex to  $1/6$  as broad; joints 2-6 of the funiculus broader than long, terminal joint longer than the preceding 6 together. Pro-mesonotum rounded in profile; seen from above, with convex sides; mesoëpinotal constriction distinct; epinotum from above rectangular in outline,  $4/7$  the maximum width of the promesonotum; spines blunt, triangular,  $1/2$  in length the distance between them. Petiolar node, from above, elliptical,  $3/4$  as long as broad. Postpetiole, from above, with concave anterior face and convex posterior face, rounded at the sides, broader than petiole.

Surface of body opaque, densely punctate.

Hairs of head clavate, sparse, regularly arranged; a row of about 7 long, clavate hairs on outer margin of scapes; occasional clavate hairs on thorax and gaster. Pubescence most abundant on gaster, legs, and antennae.

Color of body dark reddish brown, approaching black on the margins of the thorax, petiole, and postpetiole; mandibles, antennæ, and legs ferruginous.

Described from 3 workers in Dr. W. M. Wheeler's collection from Tuli Creek near San Mejuel, Nicaragua taken by C. R. Halter November, 1916 from the stomach of a tree toad, *Dendrobates tinctorius* (Schneider). The toad was captured during a shower about 10 A. M. among the leaves of the floor of the forest surrounding the creek. The ants were evidently nocturnal for one seemed partly digested.

This species resembles *R. balzani* Emery in general habitus but differs in its larger size, darker color, shape of the clypeus and proportions of the funicular joints; the arrangement of the clavate hairs of the head is singularly similar. From *R. batesi* Emery it differs, comparing with the original description and drawing, in mandibular teeth and proportions of the terminal joint to the remainder of the funiculus; the clypeus is not shown or described for comparison. A fourth member of this group is *R. barberi* Mann, which is much smaller and differs distinctly in a number



of characters, including the proportions of the funicular joints and in the mandibular teeth.

*Heptastruma*, gen. nov.

Worker: Size small. Head above antennal insertions with two rounded transverse ridges; subquadrate; posterior border broadly excised, occipital corners rounded; frontal carinae lobate and but slightly raised; antennal fossae lateral, as long as the scapes, shallow; sides of head produced as an auriculate ridge in front of fossae in a dorso-ventral position; gular surface convex, antennal scrobes and posterior border of head enclosing a roughly cordiform ventral area containing a median longitudinal impression; back of head with a broad shallow impression on either side of a median occipital notch; occipital corners with a broad groove produced obliquely from dorsal surface to posterior ventral margins. Clypeus broader than long, with transverse anterior margin. Mandibles short, stout, arcuate, of two portions: a basal thickened subparallel portion and an inwardly curved apical portion which is on the outer surface, evenly rounded into the apical teeth, on the inner concave surface, irregularly and sharply crenulate; two stout subequal apical teeth. Antennae short, 7-jointed, joints following 1st funicular joint forming a thick club; scapes broad, geniculate; 1st funicular joint narrowed basally, about twice as long as maximum breadth and longer than the three following joints, joints 2-5 broader than long, terminal joint longer than the preceding joints of the funiculus. Thorax from above about  $\frac{2}{3}$  as broad as long, about  $\frac{2}{5}$  as broad through epinotum as through pronotum; pro-mesonotal sides convex, epinotal sides subparallel. Thorax in profile a little over twice as long as high, without distinct sutures, of two subquadrate segments inclined forwardly, divided by a point midway between the fore and middle legs, the fore segment  $\frac{9}{10}$  height of the rear segment, and a short triangular antero-dorsal segment articulating with the head; epinotal declivity armed on each side only with the low dorsal protuberance of the slight carina. Petiole from above with short peduncle and transversely elliptical node, in profile higher than long. Postpetiole from above transversely narrow-elliptical, in profile perpendicularly elliptical. Gaster ovate, first gastric segment covering about  $\frac{3}{5}$  the surface; sting long and projecting. Legs of medium length,

fore coxae irregularly subglobose, hind coxae much smaller and subcylindrical, fore femora broader and longer than hind femora, median and hind tibiae spurless, tarsal joints of middle and hind legs (fore tarsi missing in the genotype) subequal, short, the five together about as long as the femur, subcylindrical, the basal joint broadest; claws stout, simple.

Integument opaque, reticulate with fine punctuations.

Hairs of body scanty; scattered, small, clavate hairs on body, which become on the posterior half of the gaster large and well developed; simple hairs few, most numerous at the venter and on the appendages; outer margins of antennal scapes with a few long clavate hairs. Pubescence confined largely to the funicular and tarsal joints.

Color dull ferruginous.

Genotype: *Heptastruma wheeleri*, n. sp.

*Heptastruma wheeleri*, n. sp. (Fig. 13 A, 13 B)

Worker: Length 1.3 mm.

Head in outline resembling the illustration accompanying the original description of *Rhopalothrix balzani* Emery in general proportions; excluding mandibles, broader than long; dorsal surface with two conspicuous rounded transverse ridges, the upper gently arched upwards, the lower more sharply arched upwards in an obtuse angle; clypeus roughly depressed pentagonal with slightly concave base (anterior margin), short sides, and rounded apical angle; mandibular teeth about half the length of the curved portion of the mandibles, the crenulate concave surface of the mandibles having the two basal crenulations largest and sharpest; antennal scapes stout, extending to the angles of the broadest part of the head, over twice as broad at the elbow as at the distal end; funiculi stout, 1st joint 0.7 the length of the following 4 joints, 2nd joint narrowed at base to about half its apical width, penultimate joint shorter than 3 and 4 together, terminal joint 1.16 the length of the 5 preceding joints. Thorax in profile gently depressed in pro-mesonotal and meta-epinotal regions. Petiole, from above, with short peduncle constricted medially and a transversely elliptical node which is as long and almost twice as wide as the peduncle; with a blunt antero-ventral tooth directed forward; in profile, with flat anterior face which becomes slightly convex basally, meet-

ing the dorsal surface at an obtuse angle, dorsal surface convex, ventral surface, posterior to the tooth, convex. Postpetiole, from above, transversely elliptical, 0.4 as long as broad, in profile perpendicularly elliptical, about 0.6 as long as high. Gaster ovate, with truncate anterior margin. Legs of medium length.

Surface of body opaque; reticulate with fine punctations; surface of mandibles roughened with minute tubercles; surface of antennal scapes coarsely reticulate punctate, funiculi smooth; legs reticulate punctate. Hairs of body scanty; scattered small clavate hairs on the body, becoming large and well developed on the posterior half of the gaster; simple hairs, most numerous at the venter and on the appendages; outer margin of antennal scapes with about 8 long clavate hairs. Pubescence confined largely to the funicular and tarsal joints.

Color of body dull ferruginous, appendages hardly lighter.

Type: One worker taken by myself near Casa Harvard, Central Soledad, Cienfuegos, Cuba, July 24, 1933, in red clay from under stones and grass roots which had been run through a Berlese funnel.

This species seems nearer to *Rhopalothrix balzani* Emery in general habitus than to any other described ant. The size, however, is much smaller; the eyes, distinct mesometanotal suture, and epinotal spines are lacking and the mandibles are entirely different.

The combination of the curious transverse ridges of the head, the arcuate mandibles and their dentation, the lack of eyes, and the minute size easily distinguish this ant from the genus *Rhopalothrix* or any other described genus. This strange eyeless ant is undoubtedly an ancient relict belonging to the «microgenton» of Silvestri.

With distinct pleasure I add this genotype to the deservedly long list of ants named after Dr. W. M. Wheeler.

*Atta (Mycocepurus) smithi* Forel var.  
*borinquenensis* Wheeler

The small craters of this variety were numerous in several localities about Soledad. Workers were watched as they cut off pieces of the fruit of *Ficus aurea* Nuttall on the ground and carried them to their nests. Colonies dug up revealed empty seeds in unused chambers and fungus

gardens in main chambers on this plant substratum. A colony kept in the laboratory maintained a thriving fungus growth on the *Ficus*. This species also grows a fungus like that of *Cyphomyrmex rimosus* and similarly on caterpillar excrement (Wheeler, 1907). It would seem transitional in development to the leafcutting *Atta*.

*Cyphomyrmex rimosus* Spinola var. *minutus* Mayr

Colonies of this ant with their fungus gardens were kept under observation in the laboratory by supplying them with caterpillar excrement upon which the fungus developed.

### *Cryptocerus varians* F. Smith

A number of colonies of *variens* were kept under observation in the laboratory and revealed many interesting habits. Because of their short legs they were able to run back-wards as rapidly as forwards, a presumable adaptation to life in hollow twigs. Callows took a long time to attain the adult coloration, the soldiers requiring less than the workers, the saucer-shaped heads of the soldiers turning black before the rest of the body.

### Subf. Dolichoderinae

#### *Tapinoma litorale* Wheeler var. *cubaënsis* Wheeler

In one circumscribed area in the Limones Seboruco, Soledad, I took a number of colonies of this variety in the cavities of twigs. Careful examination of these colonies revealed three with micropterous females. One of the colonies contained many mites, the others appeared normal, and all had quantities of brood. There were 14 such females of which 7 came from one apparently normal colony. Of these, 9 had miniature fore wings and hind wings reduced to mere stumps; 2 had miniature fore and no hind wings; one had miniature fore and only one stumpy hind wing; and one had stumpy fore and no hind wings.

In the colony containing the 7 micropterous females the average length of the workers was 1.87 mm., of the 5 normal dealated females present 3.22 mm, and of the 7 micropterous females 2.07 mm.

The eyes of the micropterous females were smaller than those of the alate females; the ocelli were vestigial or absent, being indicated on several pale specimens merely by slightly

darker areas; the thorax and gaster were disproportionately smaller; the color was distinctly lighter, varying in the specimens from pale yellow-brown to light brown, the gaster being darker than the rest of the body. The maximum length of the wings was  $1/3-1/2$  that of the thorax and the maximum venation consisted of one or two vaguely outlined median veins with short branches; the general shape was narrow-elliptical to a mere crumpled stump.

Dr. W. M. Wheeler has recorded in an unpublished manuscript on Mexican ants the occurrence of dimorphism in the females of *Tapinoma ramulorum* and two of its subspecies, one female «being the usual type, the other a microgyne, distinguished by the peculiar shape of its head, its less robust thorax and minute wings, with greatly, reduced venation».

#### Subf. Formicinae

*Paratrechina* (Nylanderia) *trogloodytes*,  
n. sp. (Fig. 7)

Worker: Length 2.2-2.5 mm.

Head longer than broad, slightly narrower in front than behind, dorsal posterior border straight, gently emarginate ventrally, sides and posterior corners evenly rounded. Eyes much reduced, slightly greater in diameter than the diameter of that part of the antennal scapes nearest them and slightly less in diameter than the distal part of the scapes; situated on the dorsal surface of the head between the posterior end of the frontal carinae and the lateral margins of the head, to which they are closer; of a median convex portion and an annular slightly raised periphery. Mandibles with convex external borders, concave on the under surface; apical borders with a series of somewhat irregular fine teeth, the apical tooth much the largest. Maxillary palpi not reaching to the thorax; clypeus convex in the middle, depressed at the sides, anterior border rounded, posterior border slightly depressed at the frontal area; frontal area slightly convex medially, no frontal groove; frontal carinae low, diverging above and below the antennal insertions. Antennae long and slender; scapes very little curved, slightly larger in diameter distally, extending not quite half their length beyond the occipital corners; funiculus 1.5-1.6 length of the scape, first joint slightly shorter than the 2nd and 3rd together, joints 2-8

subequal, increasing in length distally, terminal joint 2.5 times the length of the penultimate, all joints longer than broad, 6th joint about twice as long as broad. Thorax in profile of three convexities, the anterior two (the prothoracic and meso-metathoracic) nearly confluent, the third (epinotal) lower and separated from the second, at the metathoracic-epinotal suture, by a deeper impression containing a projecting metathoracic spiracle; thorax from above with subparallel sides posterior to the enlarged convex pronotum. Two projecting spiracles on sides of the epinotum near the declivity. Petiole slightly longer than high, truncate dorsally, anterior face a little concave, posterior face slanting, convex; ventrum a little convex medially; petiole postero-ventrally prolonged as a small lobe under the anterior face of the gaster. Gaster equal in length to the thorax, with nearly flat slanting anterior face. Legs rather long and slender.

Surface of body smooth and shining; integument almost transparent.

Hairs of body long and of varying length, coarse, with pointed ends, brownish in color, erect, thinly distributed on body, being most numerous on dorsal surface of head and gaster; shorter, finer suberect to sub-appressed hairs on mandibles, antennae and legs which are whitish or pale yellowish in color; fine whitish pubescence on antennal and tarsal joints.

Color of body pale, clear yellow, the gaster reflecting a brownish color; margins of mandibles infuscated; antennae and legs pale dull yellow.

Described from a score of workers collected by myself near Casa Harvard, Soledad, Cienfuegos, Cuba, August 30, 1933. The ants were in the damp soil of a limestone cave.

This form is very close to *Paratrechina* (*Nylanderia*) *myops* Mann from which it differs in distinctly larger size and in the shape of the petiole.

#### Literature cited

The original descriptions of all the ants discussed have been consulted. The references to them and to the many papers dealing with these ants and related forms have been omitted to save space.

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